Nationwide Permit Expanded Definitions, Seattle District

Alkali Wetlands: Alkali wetlands are characterized by the occurrence of shallow saline water. In eastern Washington these wetlands contain surface water with specific conductance that exceeds 3000 micromhos/cm. These wetlands provide the primary habitat for several species of migrant shorebirds and are also heavily used by migrant waterfowl. They also have unique plants and animals that are not found anywhere else in eastern Washington. For example, the small alkali bee that is used to pollinate alfalfa and onion for seed production lives in alkali systems. It is a valuable natural resource for agriculture in the western U.S. and especially in eastern Washington (Delaplane and Mayer, 2000). (Note: The "regular" bees used to pollinate fruits and vegetables are generally too large to pollinate the small flowers of these commercially important plants).

The salt concentrations in these wetlands have resulted from a relatively long-term process of groundwater surfacing and evaporating. These conditions cannot be easily reproduced through compensatory mitigation because the balance of salts, evaporation, and water inflows are hard to reproduce, and to our knowledge has never been tried. Alkali wetlands are also rare in the landscape of eastern Washington. Of the several hundred wetlands that were surveyed and visited as part of the function assessment project and the revisions to the rating system, only nine could be classified as alkali.

Alkali wetlands would likely be difficult to reproduce through compensatory mitigation and are relatively rare in the landscape. No information was found on any attempts to create or restore alkali wetlands. Any impacts to alkali wetlands will, therefore, probably result in a net loss of wetland.

A wetland is considered alkali if it meets **one** of the following three criteria.

- The wetland has a conductivity > 3.0 mS/cm.
- The wetland has conductivity between 2.0 - 3.0 mS, and more than 50% of the plant cover in the wetland can be classified as "alkali" species (see Table 2 for list of plants found in alkali systems).
- If the wetland is dry at the time of your field visit, the central part of the area is covered with a layer of salt.

OR it meets two of the following three sub-criteria.

- Salt encrustations around more than 80% of the edge of the wetland
- More than ¾ of the plant cover consists of species listed on Table 2
- A pH above 9.0. All alkali wetlands have a high pH, but please note that some freshwater wetlands may also have a high pH. Thus, pH alone is not a good indicator of alkali wetlands.

Aspen Wetland Forests: Aspen stands in a forested area provide habitat that far exceeds the small acreage of these stands and relatively small number of stems (Hadfield and Magelssen 2004). Furthermore a mature stand of aspen and its underground root system may be difficult to reproduce.

Regeneration of aspen stands by sexually produced seeds is an unusual phenomenon (Romme et al. 1997).

Aspen stands are also important because they represent a second "priority habitat" as defined by the state department of Fish and Wildlife. "*Priority habitats* are those habitat types or elements with unique or significant value to a diverse assemblage of species." (Washington State Department of Fish and Wildlife (WDFW), http://www.wa.gov/wdfw/hab/phslist.htm, accessed October 15, 2002). NOTE: All wetlands are categorized as a priority habitat by the WDFW. Wetlands with aspen stands, therefore, represent two priority habitats that coincide.

(*Populus tremuloides*) are a dominant or co-dominant of the "woody" vegetation in aspen forests. (Dominants means it represents at least 50% of the cover of woody species, co-dominant means it represents at least 20% of the total cover of woody species)

Bogs and Bog-like Wetlands: Wetlands with organic soils in the form of either peat or muck with the following characteristics: hydric organic soils (peat and/or muck) typically 16 inches or more in depth (except over bedrock or hardpan); and vegetation such as sphagnum moss, Labrador tea, bog laurel, bog rosemary, sundews, and sedges; bogs may have an overstory of spruce, western hemlock, lodgepole pine, cedar, white pine, crabapple, or aspen, and may be associated with open water. {Adapted from the Forest Practices Board Manual dated July 1995 that implements WAC 222 (Forest Practices Rules) and as adopted in WAC 173-202 (Washington Forest Practices Rules and Regulations to Protect Water Quality)}. The wetlands protected by this regional condition can be found throughout Washington State. They have many different names including bogs, fens, peat lands, sphagnum bogs, minerotrophic wetland communities, floating mat bogs, etc. They all have organic soils in the form of either peat or muck. However, the vegetation communities can vary greatly depending upon the landscape position, climate, hydro-period, nutrients, chemistry, etc. If organic soils are present, the Corps must be contacted for verification of the jurisdictional determination and therefore, the applicability of nationwide permit regional condition 1.

To assist in identifying these areas, the document titled *Preliminary Classification of Native, Low Elevation, Freshwater Wetland Vegetation in Western Washington* dated March 1994 from Washington State Department of Natural Resources can be helpful. The presence of bogs **may** also be determined by using the following identification key. The identification key below does not always capture the bogs identified as needing protection. Additional keys may be developed in the future which may capture all of the desired systems. The definition will be revised if that occurs.

A bog is a wetland that has following characteristics: hydric organic soils (peat and/or muck) typically 16 inches or more in depth (except over bedrock or hardpan); and vegetation such as sphagnum moss, Labrador tea, bog laurel, bog rosemary, sundews, and sedges; bogs may have an overstory of spruce, western hemlock, lodgepole pine, cedar, white pine, crabapple, or aspen, and may be associated with open water. {Adapted from the Forest Practices Board Manual dated July 1995 that implements WAC 222 (Forest Practices Rules) and as adopted in WAC 173-202 (Washington Forest Practices Rules and Regulations to Protect Water Quality)}.

Question	**Response**	**Action**
1. Area is dominated by mosses, low grass-like or shrubby vegetation.	Yes No	Go to #4 Go to #2
2. Area has a mixture of stunted trees (e.g. sitka spruce, western hemlock, western red cedar, lodgepole pine, Englemann's spruce, western white pine, aspen or crab apple)	Yes No	Go to #4 Go to #3
3. Area is forested with sitka spruce, western red cedar, western hemlock, lodgepole pine, quaking aspen, or western white pine	Yes No	Go to #4 Not a bog.
4. Area has organic soils, either peats or mucks, deeper than 16 inches. Organic soils are defined as follows based on the information in *Soil Taxonomy* (1992):	Yes No	Go to #6 Go to #5

(1) Soils with an organic carbon content of 18% or more (excluding live roots) if the mineral fraction contains more than 60% clay;

(2) Soils with an organic carbon content to 12% if the mineral fraction contains no clay;

(3) Soils with an organic carbon content between 12-18% based on the percentage of clay present (multiply the actual percentage of clay by 0.1 and add to 12%).

It is not usually necessary, however, to do a chemical analysis of the soil to determine if a soil is organic. Organic soils are easy to recognize as black-colored mucks or as black or dark brown peats. Mucks feel greasy and stain fingers when rubbed between the fingers. Peats have plant fragments visible throughout the soil and feel fibrous. Many organic soils, both peats and mucks, may smell of hydrogen sulfide (rotten eggs).

5. Area has organic soils, either peats or mucks, that are less than 16 inches deep over bedrock or hardpan; or, presence of a histic epipedon between 8' and 16" over a mineral soil.	Yes No	Go to #6 Not a bog
6. More than 30% of the total plant cover is provided by one or more of the characteristic bog species in Washington State listed below. Total cover is estimated by assessing the area of land covered by the shadow of plants if the sun were directly overhead.	Yes No	IS A BOG Not a bog

NOTE: Forests may contain several layers of plant that cover the ground. In arriving at the 30% minimum cover look at plants in the "canopy", the "understory", and the

"groundcover". You are trying to determine whether the total "footprint" of the characteristic bog species in Washington State listed below, be they canopy, understory or groundcover, is more than 30%.

Characteristic Bog Species In Washington State:

NOTE: Refer to the following sources for questions about updates in synonymy and current plant taxonomic nomenclature: http://flora.ilangainc.com/ and http://biology.burke.washington.edu/herbarium/imagecollection.php

Scientific Name	Common Name
Andromeda polifolia	Bog rosemary
Betula glandulosa	Bog birch
Carex brunescens	Brownish sedge
Carex buxbaumii	Brown bog sedge
Carex canescens	Hoary sedge
Carex chordorhiza	Creeping sedge
Carex comosa	Breaded sedge
Carex lasiocarpa	Wolly-fruit sedge
Carex leptalea	Bristly-stalk sedge
Carex limosa	Mud sedge
Carex livida	Livid sedge
Carex paupercula	Poor sedge
Carex rostrata	Beaked sedge
Carex sexatilis	Russet sedge
Carex sitchensis	Sitka sedge
Carex interior	Inland sedge
Carex pauciflora	Few-flower sedge
Cladina rangifera	Reindeer lichen
Drosera rotundifolia	Sundew
Eleocharis pauciflora	Few-flower spike rush
Empetrum nigrum	Black crowberry
Eriophorum chamissonis	Cottongrass
Eriophorum polystachion	Coldswamp cottongrass
Fauria crista-galli	Deer-cabbage
Gaultheria shallon	Salal
Gentiana douglasiana	Swamp gentian
Juncus supinformis	Hairy leaf rush
Kalmia occidentalis	Bog laurel
Ledum groenlandicum	Labrador tea
Lysichitum americanum	American skunk cabbage
Malus fusca	Pacific crabapple
Menyanthes trifoliata	Bog bean
Myrica gale	Sweet gale
Pedicularis groenlandica	Elephant's-head lousewart

Picea engelmannii	Engelmann's spruce
Picea sitchensis	Sitka spruce
Pinus contorta	Lodgepole pine
Pinus monticola	Western white pine
Platanthera dilatata	Leafy white orchid
Populus tremula	Quaking aspen
Potentilla palustris	Marsh cinquefoil
Pteridium aquilinum	Bracken fern
Rhynchospora alba	White beakrush
Salix commutata	Under-green willow
Salix eastwoodiae	Mountain willow
Salix farriae	Farr willow
Salix myrtillifolia	Blue-berry willow
Salix planifolia	Diamond leaf willow
Sanquisorba officinalis	Great burnet
Sphagnum spp.	Sphagnum mosses
Spiraea douglasii	Douglas' spiraea
Spiranthes romanzofianna	Hooded ladies'-tresses
Thuja plicata	Western red cedar
Tofieldia glutinosa	Sticky false-asphodel
Tsuga heterophylla	Western hemlock
Vaccinium occidentale	Western huckleberry
Vaccinium oxycoccus	Bog cranberry

NOTE: This list does not contain all of the plant species found in bog and bog-like wetlands in Washington. Other species may be present and the area may still be identified as a bog or bog-like system. Latin names and spelling are based on the U.S. Fish and Wildlife Service, "National List of Plant Species that Occur in Wetlands: Washington". Biological Report May 1988 NERC-88/18.47.

Coastal Dune: A dune system is characterized by a set of dune forms recurring in a pattern over the dune landscape. Along the Pacific Northwest coast four types of dune systems can be distinguished. The State of Washington has, in most cases, only the parallel ridge system.

The parallel ridge system is characterized by several ridges arranged in a parallel series starting from the waterward fore dune and extending inland up to 2 kilometers. The fore dune is a ridge of sand parallel to the beach just above the limit of ordinary wave action. Often, the fore dune is not completely stabilized by vegetation. Swales occur between the closely spaced ridges. Some of these swales are filled with depress ional areas supporting wetland habitat and open water. (From Weidemann (1984)).

The landward extent of the dune system is determined by topographic breaks, bluffs, soils developed on the beach or on dunes, etc. The soils series which meet this definition include, but are not limited to, Beaches, Dune lands, Seastrand, Orcas, Yaquina, Westport, Netarts, Ocosta, and Fluvaquents (tidal).

Interdunal Wetlands: Wetlands west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO) are considered to be interdunal wetlands.

In practical terms that means the following geographic areas:

- Long Beach Peninsula- lands west of SR 103
- Grayland-Westport- lands west of SR 105
- Ocean Shores-Copalis- lands west of SR 115 and SR 109

Wetlands in Coastal Lagoons: A wetland is considered a coastal lagoon if it meets all of the following criteria:

- The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks
- The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)*

Essential Fish Habitat: Those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.

Forage Fish: Small fish which breed prolifically and serve as food for predatory fish.

Kettle: A kettle is a particular type of usually deep bowl shaped depression formed by glacial action during periods of glacial retreat. One explanation for their formation is that in some circumstances, a large block of ice broke off from the retreating glacier. Although clay, silt, sand, gravel, or coarser material was generally washing out of the glacier with its melt water, there was not enough to fill the location of the large ice blocks that eventually melted. What remained was a relatively deep "hole" or depression, often shaped like a "kettle". Kettles are almost always permanently ponded. Their hydrology may be epiaquic (wet from the top down) or endoaquic (wet from the bottom up) but, like "prairie potholes", they tend to be endoaquic and intercept the regional water table. Because of their depth, they tend to be vegetated only around their shallower edges. They also tend to be in headwater positions with little or no input of surface runoff. Their soils are usually less fertile than those in prairie potholes. As a result, more acidic soil conditions are not unusual and kettles tend to be in the types of locations in which raised bogs form. Bogs are defined above and are also offered special protection.

Marine Waters with Eel Grass Beds: Eelgrass *(Zostera sp.)* is one of the "Saltwater Habitats of Special Concern" in Washington State (WAC 220-110-250(3) (a)), and serves essential functions in the developmental life history of fish or shellfish.

Mature Forested Wetland: There are two definitions for mature forested wetlands, one for the west and one for the east side of Washington. The definitions for both are as follows (from

Washington State Wetlands Rating System for Western Washington, Second Edition [August 1993, Publication 93-74] and Eastern Washington [October 1991, Publication 91-58]):

a. Western Washington:

1. Does 50% of the cover of upper forest canopy consist of evergreen trees older than 80 years or deciduous tress older than 50 years? **or**
2. 50% of the forest canopy consist of trees taller than 50', and the structural diversity is high as characterized by a multi-layer community of trees > 50' tall and trees 20'-49' tall and shrubs and herbaceous groundcover; **and**
3. < 25% of the cover in the herbaceous/ground cover or shrub class are invasive exotic plant species listed in the following table.

b. Eastern Washington:

1. Forested wetlands qualify as mature forested wetlands when the average age of dominant trees in the forested wetland is > 80 years; **or**
2. The average age of dominant trees in the forested wetland is 50 – 80 years, and there is high structural diversity as characterized by a multi-layer community of trees > 50' tall and trees 20' – 49; tall and shrubs and herbaceous groundcover; **and**
3. < 50% of the dominant plants in one or more layers (canopy, young trees, shrubs, herbs) are invasive/exotic plant species listed in the following table.

At least ¼ acre of the Forested class should meet the size and age criteria. The size of trees is often not a measure of age, and size cannot be used as a surrogate for age. To determine age, gather historical data (e.g. aerial photos, land use records, permits, etc.).

List of Invasive/Exotic Plant Species for Mature Forested Wetlands in Western and Eastern Washington

NOTE: Refer to the following sources for questions about updates in synonymy and current plant taxonomic nomenclature: http://flora.ilangainc.com/ and http://biology.burke.washington.edu/herbarium/imagecollection.php

Scientific Name	*Common Name*
Agropyron repens	Quackgrass
Alopecurus pratensis, A. aequalis	Meadow Foxtail
Arcticum minus	Burdock
Bromus tectorum, B. rigidus, B. Brizaeformis, B. secalinus, B. japonicus, B. mollis, B. commutatus, B. inermis, B. erectus	Bromes
Cenchrus longispinus	Sandbur
Centaurea solstitialis, C. repens, C. cyanus, C. maculosa, C. diffusa	Knapweeds
Circium vulgare, C. arvense	Thistles
Cynosursus cristasus, C. echinatus	Dogtail
Cytisus scoparius	Scot's Broom
Dactylis glomerata	Orchardgrass
Dipsacus sylvestris	Teasel

Digitaria sanguinalis	Crabgrass
Echinochloa crusgalli	Barnyard Grass
Elaeagnus augustifolia	Russian Olive
Euphorbia peplus, E. esula	Spurge
Festuca arundinacea, F. pratensis	Fescue
Hedera helix	English Ivy
Holcus lanatus, H. mollis	Velvet Grass
Hordeum jubatum	Foxtail Barley
Hypericum perforatum	St. John's Wort
Iris pseudacorus†	Yellow Iris
*Juncus effusus**	Soft Rush
Lolium perenne, L. multiflorum, L. temulentum	Ryegrass
Lotus corniculatus	Birdsfoot Trefoil
Lythrum salicaria	Purple Loosestrife
Matricaria matricarioides	Pineapple Weed
Medicago sativa	Alfalfa
Melilotus alba, M. officinalis	Sweet Clover
Phalris arundinacae	Reed Canarygrass
Phleum pretense	Timothy
Phragmites australis	Reed
Poa compressa, P. palustris, P. pratensis	Bluegrass
Polygonium aviculare, P. convolutus, P. cuspidatum, P. lapathifolium, P. persicaria	Knotweeds
Ranunculus repens	Creeping Buttercup
Rubus discolor, R. laciniatus, R. vestitus, R. macrophyllus	Non-native Blackberries
Salsola kali	Russian Thistle
Setaria viridis	Green Bristlegrass
Sisymbrium altissimum, S. loeselii, S. officinale	Tumblemustards
Tanacetum vulgare	Tansy
Trifolium dubium, T. pratense, T. repens, T. arvense, T. subterraneum, T. hybridium	Clovers
Cultivated species:	Wheat, Corn, Barley, rye, etc.

† In Western Washington only * In Eastern Washington only

Native Species: Species that historically occur in a particular ecosystem and are not introduced.

Permanent Adverse Impacts: Aquatic resource losses which are specifically identifiable, reasonably likely to occur, and of importance to the human or aquatic environment

Riparian Corridors: *Riparian corridors are the ecologically defined areas adjacent to flowing waters. They contain* moist soils and plants that are adapted to wet conditions. A riparian habitat area (RHA) is defined by the Washington State Department of Fish and Wildlife as the area adjacent to aquatic systems with flowing water (e.g., rivers, perennial or intermittent streams, seeps, springs) that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. Riparian habitat encompasses the area beginning at the ordinary high water line and extends to that portion of the terrestrial landscape that directly influences the aquatic ecosystem by providing shade, fine or large woody material, nutrients, organic and inorganic debris, terrestrial insects, or habitat for riparian-associated wildlife. It includes the entire extent of the floodplain because that area significantly influences and is influenced by the stream system during flood events. The riparian habitat area encompasses the entire extent of

vegetation adapted to wet conditions as well as adjacent upland plant communities that directly influence the stream system. Riparian habitat exists in a wide variety of conditions ranging from severely damaged to pristine. Riparian vegetation refers specifically to plant communities that are adapted to wet conditions, are distinct from upland communities, and that occur immediately adjacent to aquatic systems.

Salt Marsh: The following definition of a salt marsh shall be used in implementing the Nationwide Permit program:

> Any area adjacent to salt water where the interstitial soil salinity is greater than or equal to 0.5 parts per thousand at any time of year or where the plant community is comprised of at least 5% total cover of any of the following species occurring singly or in combination:

NOTE: Refer to the following sources for questions about updates in synonymy and current plant taxonomic nomenclature: http://flora.ilangainc.com/ and http://biology.burke.washington.edu/herbarium/imagecollection.php

Scientific Name	Common Name
Abronia latifolia	Yellow sand verbena
Aster subspicatus	Douglas' aster
Atriplex patula	Orache
Cakile edentula	American searocket
Cotula coronopifolia	Brass buttons, Mud-disk
Distichlis spicata	Seashore saltgrass
Eleocharis parvula	Small spike-rush
Glaux maritime	Sea milk-wort
Grindelia integrifolia	Entire-leaved gumweed
Honkenya peploides	Seabeach sandwort
Jaumea carnosa	Fleshy jaumea
Juncus geradii	Mud rush
Orthocarpus castillejoides	Paintbrush owl-clover
Plantago maritime	Sea plantain
Puccinellia pumila	Dwarf alkali-grass
Salicornia virginica	American glasswort
Scirpus maritimus	Seacoast bulrush
Spartina anglica	Spartina
Spartina alternifolia	Spartina
Spergularia canadensis	Canadian sand-spurry
S. marina	Salt marsh sand-spurry
Stellaria humifusa	Salt marsh starwort
Triglochin concinnum	Slender arrow-grass
T. maritimum	Sea arrow-grass

In addition, when found in coastal areas adjacent to salt water the following species usually indicate the presence of a salt marsh. All of the species in the second list are found in fresh

situations (sometimes well inland) as well as salt/brackish marshes. If there is any doubt that the area is a salt marsh, soil salinity should be established.

Scientific Name	Common Name
Agrostis alba (Agrostis gigantea)	Creeping bentgrass
Carex lyngbyei	Lyngby's sedge
Deschampsia caespitosa	Tufted hairgrass
Festuca rubra	Red fescue
Hordeum brachyantherum	Meadow barley
H. jubatum	Foxtail barley
Juncus balticus	Baltic rush
Lilaeopsis occidentalis	Western lilaeopsis
Potentilla pacifica (Argentina egedii ssp. egedii)	Silverweed
Scirpus acutis (S. validus)	Hard-stemmed bulrush
Scirpus americanus	American bulrush

Special Aquatic Sites: Special aquatic sites include wetlands, mudflats, vegetated shallows, coral reefs, riffle and pool complexes, and sanctuaries and refuges as defined in 40 CFR 230.40 through 230.45 (*Guidelines for Specification of Disposal Sites for Dredged or Fill Material*).

Specialized Seasonal Wetlands: Generally, the following five types of wetlands are seasonally flooded, palustrine impounded wetlands whose vegetation's life cycle are synchronized with rising and falling water levels. The pools are found in enclosed basins, outflow is rare and groundwater exchanges minimal, standing water is shallow, on top of hard pans or other impervious surfaces, such as basalt, and of brief duration, filled mostly during heavy rain and snow melt. Native plants have been adapted to take advantage of the brief appearance of water to flower, fruit, and seed and may appear to be dead in the summer. In the State of Washington, these wetland types are predominately found in the eastern portion of the state. However, they may also occur in some parts of western Washington. Identification of these wetlands can be difficult and should be delineated as "problem areas". A more specific description of each type is as follows:

a. Camas prairie wetlands: These systems are found in seasonally wet areas like seepages, depressions, prairies, meadows, hillsides (where moist), moist forests, and streamside areas which are often dry by late spring. Early spring water is the key. Hydrology is typically perched, but, there may be some groundwater exchange and there may be some slight water flow. The soil surface may be rich in organic matter rather than being clay or hardpan, but, more or less impervious surfaces are found in the soil profile so that water is perched at the surface. Camas prairie meadows are specifically those systems as described above supporting communities of common camas (*Camassia quamash*) and great camas (*C. leichtlinii*). Geographic distribution of these systems include Thurston, Lewis, Clark, Skamania, Klickitat, Island, and San Juan counties, and the Columbia plateau and prairie pothole regions (including the Moses Lake area, Grant, and Spokane counties).

The presence of camas prairie wetlands **may** also be determined by using the following identification key. The identification key below does not always capture the systems identified as needing protection. Additional keys may be developed in the future which may capture all of the desired systems. The regional condition will be revised if that occurs.

Question	Response	Action
1. Either common or great camas present as a dominant (> 20% cover)	Yes No	Go to #2 Not protected
2. Other species at the site representative of native prairies (see table below)	Yes No	Go to #3 Not protected
3. Site is delineated as a wetland	Yes No	Protected Not protected

Characteristic Native Species present in Camas Prairie Wetlands:

NOTE: Refer to the following sources for questions about updates in synonymy and current plant taxonomic nomenclature: http://flora.ilangainc.com/ and http://biology.burke.washington.edu/herbarium/imagecollection.php

Scientific Name:	Common Name:
Camassia quamash	Common camas
C. leichtliinii	Great camas
Carex inops (C. pennsylvanica)	Long-stoloned sedge
Danthonia spicata, D. californica	Oat grass
Festuca idahoensis	Fescue
Koeleria cristata	Koeleria (June grass)
Luzula campestris	Wood-rush

NOTE: This list does not contain all of the native plant species found in camas prairie wetlands in Washington. Other species may be present and the area may still be identified as a camas prairie wetlands. Latin names and spelling are based on the U.S. Fish and Wildlife Service, "National List of Plant Species that Occur in Wetlands: Washington". Biological Report May 1988 NERC-88/18.47.

b. Playa: A playa is a land form usually found in more arid regions of the west and is usually a large, shallow depression with no outlet that is intermittently ponded during those unpredictable periods of sufficient duration that enable their surface to be wet and water to accumulate. They pond water because either their surface, or a near subsurface horizon, is impervious usually due to high clay content (There may be sand on the “surface”, but an

impervious layer will not be very far below). Playas are typically less vegetated, more alkaline or saline, with typically larger pools sizes and watersheds than "vernal pools". Conditions tend to be too extreme (too dry, too wet, too high salt concentration, etc.) for dense or vigorous plant growth in the central basin of the playa. When ponded, playas can form large, shallow "lakes" that can be very valuable to migrating waterbirds in otherwise very arid regions. Playas fill from epiaquic (wet from the top down) wetting.

c. Prairie pothole: A prairie pothole is a usually closed, shallow to medium depth, bowl shaped depression formed during periods of ice age floods or glacial retreat by glacial action in areas subsequently dominated by prairie or "grassland" vegetation types. While the shallower of these depressions may dry out during years of extreme drought, unlike "vernal pools" and "playas", prairie potholes can be permanently ponded. Their plant communities tend to be dominated by perennial rather than annual plants and, depending on depth and the slopes involved, may actually feature one or more of the following plant communities: sweet meadow, shallow marsh, deep marsh, and/or vegetated shallows (i.e. dominated by submerged aquatic plants rather than emergents). Soils in and surrounding such basins tend to be fertile and unlike "vernal pools" or "playas", primary productivity tends to be high (i.e. they can produce a lot of plant matter). Often prairies potholes can be important to resting waterfowl if the vegetation "structure" is correct. Many waterfowl species find undisturbed herbaceous upland buffers (i.e. unmoved, ungrazed pasture or prairie) preferred nesting habitat. However, almost all waterfowl species find prairie potholes important brood rearing habitat. Of particular importance are the aquatic invertebrates present which can form up to 70-90% of the high protein diet required by rapidly growing young birds. Prairie potholes can have either epiaquic (wet from the top down) or endoaquic (wet from the bottom up) forms of hydrology.

d. Vernal pool: Vernal pools can be found in both eastern and western Washington. However, they are not as clearly defined and described as the vernal pools of California nor are they the same as those pools found in California. Eastern Washington vernal pools have been studied more and a definition for those found in the Columbia River basin is more developed (first definition below). In other parts of eastern Washington (areas without basalt) and in western Washington, these areas are less defined and the definition is more general (second definition below). Close coordination with the Corps is needed to ensure these systems are not present in the project area.

Columbia Basin. A vernal pool in the Columbia Basin is usually a small depression that ponds water in the colder, lower evaporation periods of winter and loses it standing water either prior to or early in the growing season. These vernal pool depressions within the Columbia Basin are inundated for only a very short time, often less than 90 days of which only 3-4 weeks may be within the growing season. These vernals are often found in a mosaic and are flooded in mid-winter and then during late winter/early spring when they briefly drain into one another or other landscape channels. The regions winters are cold and dry with most precipitation coming in the form of snow. During winter time, the pools soils and any standing water will be frozen but usually offer the first open water during late winter. Columbia Basin vernal pools typically have very shallow soils (less than 20 cm) underlain by basalt or impervious subsoil (such as high clay content horizon or ash horizon) which can effectively eliminate downward percolation. Columbia Basin vernals can also have soils deeper than 20 cm and with hydrology supported by

interflow early in the growing season. Evaporation and transpiration are the primary source of water loss through some loss to a downgradient interflow zone and underlying basalt fracture zones. Their plant community, if present, is usually dominated by short-lived native wetland annuals; later in the growing season non-wetland annual and biennial species dominate the pool environment. Columbia basin vernal pools may be inhabited with plant and animal species that are especially adapted to this ephemeral environment. When ponded, Columbia Basin vernal pools provide important foraging habitat to various species of migratory birds during the winter. Additional information regarding venal pools in eastern Washington can be found in *Vernal Pools of the Columbia Plateau* prepared by Curtis R. Björk for the Nature Conservancy dated November 1997.

The vernal pools in the Columbia Basin, however, do not have the same characteristics as vernal pools in California. Field indicators that are specific to the vernal pools in the Basin include:

1. Upland or facultative upland annual and biennial species **are dominant** within the wetland boundary late in the growing season;

2. Average water level is very shallow early in the growing season (<20 cm within first two months of the growing season);

3. Typically very shallow soils, or absence of soils, immediately on top of basalt substrate. However, some vernals have soils deeper than 20 cm and are supported by shallow groundwater flow (interflow);

4. Dominant wetland plants (facultative, facultative-wet, obligate) are annuals and are low growing. If perennial wetland plants are present, they are low growing (<30 cm high) and not dominant.

The typical vegetation patterns found in these depressional wetlands with only very short periods of inundation can be characterized as follows:

> If shallow water is present for a sufficient period in the early growing season than vegetation will consist of young, low-growing and often delicate-appearing annual OBL and FACW herbs. As the season progresses, many of these species complete their life cycle (begin fruiting) as water levels diminish. As the ground dies, a second "flush" of annual or biennial vegetation becomes established. This second association is often dominated by weedy UPL, FACU, or FAC species. In some cases, it is possible to observe the dried remains of the first (spring) association. In the spring, however, dried remains of the second (fall) association are often observable.

Other vernal pools. A vernal pool is usually a closed depression that ponds water in the cool, low evaporation periods of winter and spring in regions with cool moist winters, and dries out during the hot dry summers. Vernal pools are underlain with an impervious subsoil or near-surface parent material (such as high clay content horizon or a durapan, and/or basalt) which effectively eliminates downward percolation. Evaporation and transpiration are the only significant source of water loss. Short-lived native annuals usually dominate this plant

community. Vernal pools are typically inhabited with plant and animal species which are especially adapted to this ephemeral environment. Some of the plant species may be considered rare. When ponded, vernal pools can provide foraging habitat to various species of migratory birds. "Classic" vernal pools are epiaquic (wet from the top down) and not endoaquic (wet from the bottom up).

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